Rock Creek Monitoring

Annual Report 2020

Rock Creek at a Glance

Assessment Units

Rock Creek is a major tributary to the Snake River and has been identified as impaired by total phosphorus (TP), total suspended solids (TSS), *E. coli*, and flow alterations. The Upper Snake Rock TMDL indicates that Rock Creek is fed from springs, seeps, tailwater runoff, and its own tributaries. Monitoring Rock Creek is important because of its location, history, and pollution issues.

DEQ's partnership with the Bureau of Reclamation has sustained the monitoring efforts in the Rock Creek watershed for the last 17 years. Four sampling sites have been identified in the interest of assessing water quality conditions and parameters in this tributary to the Snake River. Monitoring efforts have been critical to develop and implement the Total Maximum Daily Load in the Upper Snake Rock watershed.

The following table is an over view of the monitoring locations that were sampled in the federal fiscal year 2020 (FY'20). This monitoring started October 1, 2019 continued through September 30, 2020. The monitoring location RCK 105 was moved to an alternate location in January due to accessibility. The monitoring remained at the alternative location for the remaining monitoring season. The alternative location is located about a half mile downstream of the original site, near where the Fourth Fork and Third Fork meet.

Table 1. Rock Creek monitoring locations.

Location Name	Site Code	Associated AU	Latitude	Longitude
Rock Creek at Mouth	RCK 104	ID17040212SK013_05	42.62088	-114.53183
Rock Creek at Rock Creek Park	RCK 103	ID17040212SK013_05	42.56517	-114.50176
Rock Creek at Rock Creek Store	RCK 101	ID17040212SK016_04	42.44132	-114.30416
Rock Creek at Fourth Fork	RCK 105	ID17040212SK018_03	42.25400	-114.25018

Project Timetable

Samples were collected monthly, starting in October of 2019 and ending in September of 2020. The following table lists the monitoring dates for Rock Creek FY'20.

Table 2. Monitoring dates for FY'20

Monitoring Dates
10/16/2019
11/19/2019
12/17/2019
1/15/2020
2/25/2020
3/17/2020
4/21/2020
5/19/2020
6/16/2020
7/21/2020
8/18/2020
9/23/2020

Rock Creek at a Glance

Overview

The Upper Snake-Rock TMDL list Rock Creek impaired for TP, TSS, *E.coli*, and flow alterations. Idaho's "Water Quality Standards" (IDAPA 58.01.02) list beneficial uses and set water quality goals for surface waters of the state be protected for beneficial uses, wherever attainable.

Beneficial uses are protected by a set of water quality criteria, which includes *narrative* (TP and TSS) and *numeric* (*E. coli*) criteria. The following table, Table 3, lists the instream water quality targets established by the TMDL to accomplish water quality goals based on the criteria for Idaho's water quality standards.

Table 3. Water quality targets for Rock Creek.

Site ID	AU	Beneficial Use	*TMDL* Targets		*Water Quality Standard*
			TSS	TP	*E. coli*
RCK 104	SK013_05	COLD, SS, SCR	52 (mg/L)	0.10 (mg/L)	576 cfu/100 mL
RCK 103	SK013_05	COLD, SS, SCR	52 (mg/L)	0.10 (mg/L)	576 cfu/100 mL
RCK 101	SK016_04	COLD, SS, PCR, DWS	52 (mg/L)	0.10 (mg/L)	---
RCK 105	SK018_03	COLD, SS, PCR, DWS	—	—	—

Note: Cold water aquatic life (COLD); salmonid spawning (SS); primary contact recreation (PCR); secondary contact recreation (SCR); domestic water supply (DWS)

Data Summary

This section provides a summary of the existing water quality data in the Rock Creek drainage of the Upper Snake Rock subbasin. DEQ collected water quality data at the four monitoring locations on Rock Creek monthly from October 2019 to September 2020.

Water chemistry samples were collected and analyzed for TP, TSS, *E. coli*, and NO_x. The following table shows the water chemistry averages for the four monitoring locations monitored in the FY'20.

Table 4. Water chemistry averages for the TMDL pollutants of concern.

Site ID	**Average TSS** (mg/L)	**Average NO_3NO_2** (mg/L)	**Average TP** (mg/L)	**Average *E.coli*** (cfu/100 mL)
RCK 104	29.27	2.61	0.08	153.82
RCK 103	34.33	2.28	0.08	181.33
RCK 101	8.38	0.07	0.03	173.43
RCK 105	2.40	0.14	0.02	8.25

Total Phosphorus

The following figure, Figure 1, shows the summary of the TP data collected at each monitoring location during the FY' 20 monitoring year. The red line shows the TP target line of 0.10 mg/L. The average TP at each monitoring location was below the TP target, however there exceedances throughout the monitoring season. The TP exceedances at RCK 104 occurred from April to August of 2020. The TP exceedances at RCK 103 occurred in December, April, May, July, and August. See section ***Exceedances*** for more information.

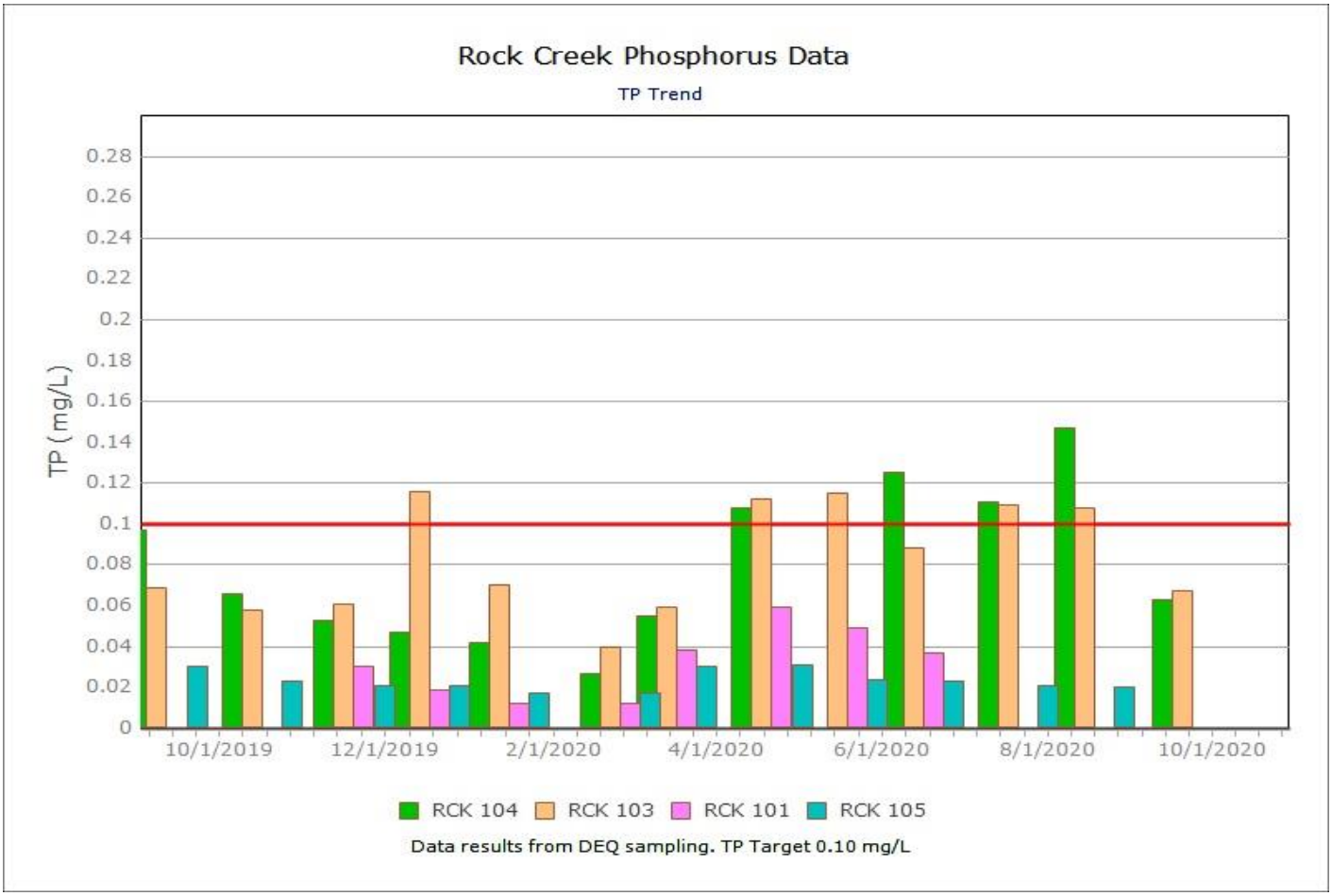


Figure 1. Total phosphorus data on Rock Creek collected during the FY' 20 monitoring year.

Total Suspended Solids

The following figure, Figure 2, shows the summary of the TSS data collected at each monitoring location during the FY' 20 monitoring year. The red line shows the TSS target line of 52 mg/L. The average TSS at each monitoring location was below the TSS target, however there were exceedances throughout the monitoring season. The TSS exceedances at RCK 104 occurred June 16, 2020 and August 18, 2020. The two TSS exceedances at RCK 103 occurred in December 2019 and May 2020. See section ***Exceedances*** for more information.

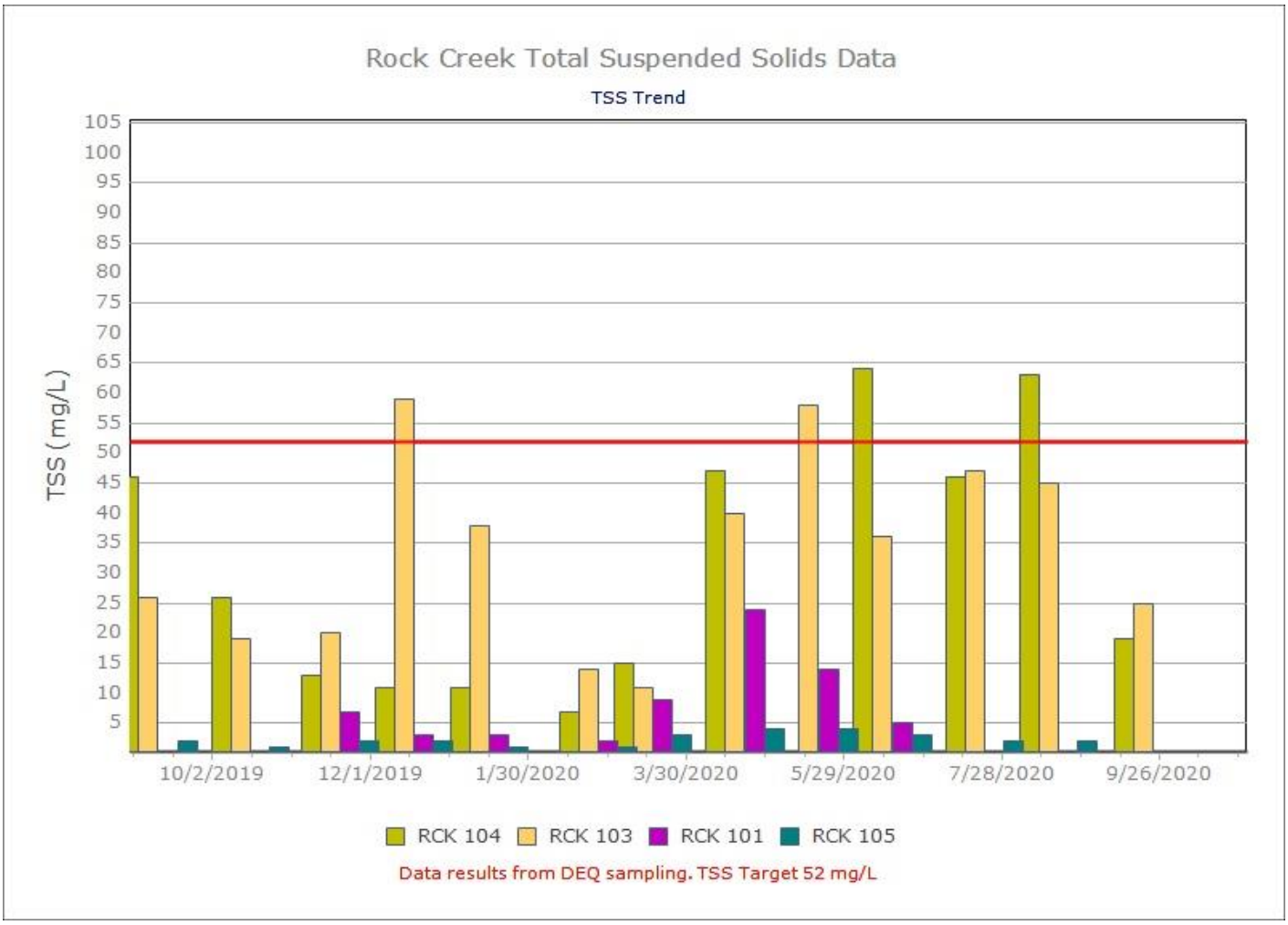


Figure 2. Total Suspended Solids data on Rock Creek collected during the FY' 20 monitoring year.

Escherichia coli

Figure 3, shows the summary of the *E.coli* data collected at each monitoring location during the FY' 20 monitoring year. Bacteria targets are set by Idaho's water quality standards (IDAPA 58.01.02.251), *E. coli* is not to exceed a single sample for secondary contact recreation of 576 colony forming units (cfu) per 100 mL of water. The red line shows the water quality standard line of 576 cfu/100mL. The average *E.coli* at each monitoring location was below the Water Quality Standard, however there was one exceedance during the monitoring season; see section ***Exceedances*** for more information.

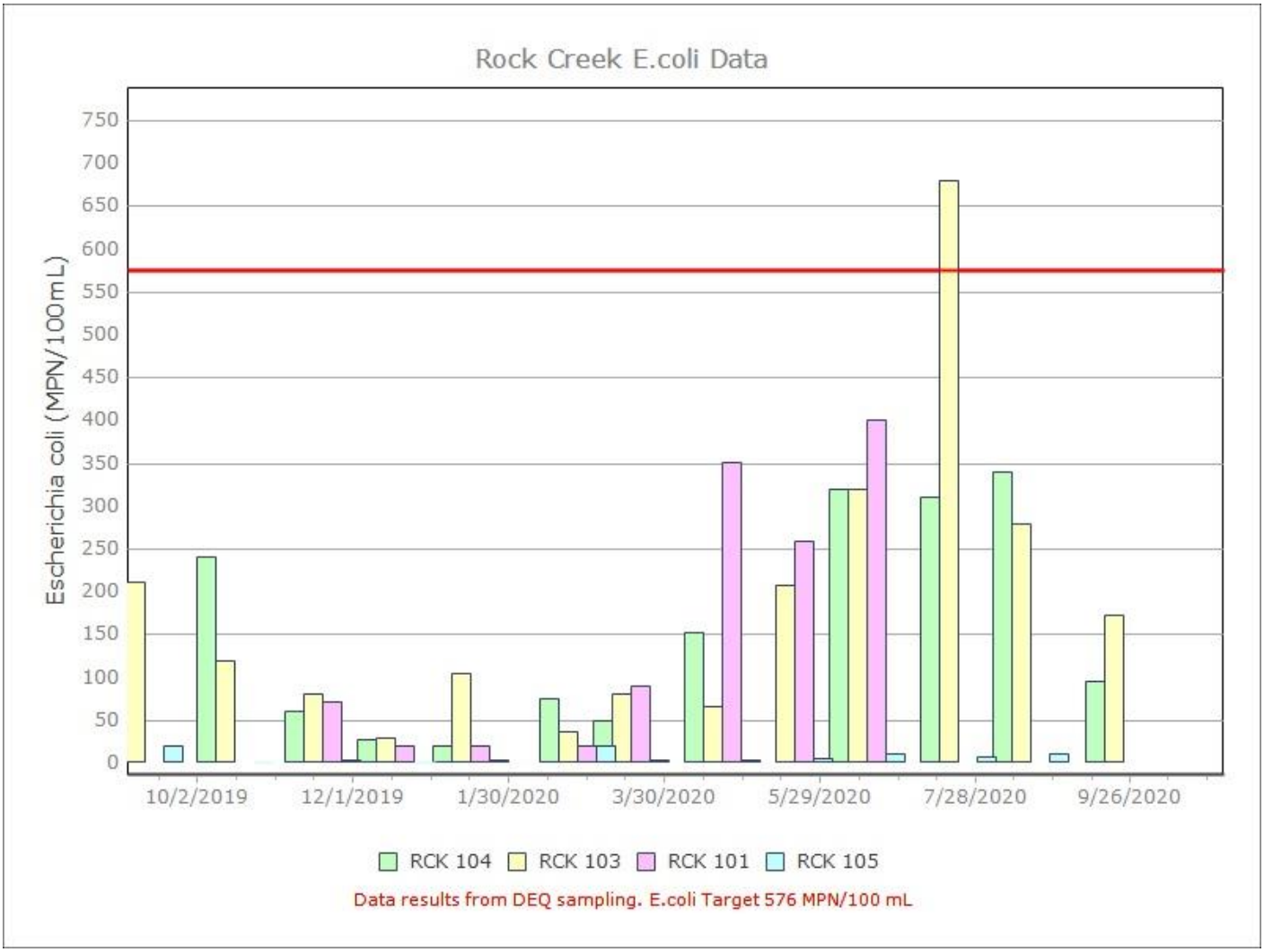


Figure 3. E.coli data on Rock Creek collected during the FY'20 monitoring year

In situ measurements for temperature, conductivity, pH, dissolved oxygen (DO), turbidity, were taken using a multi-parameter sonde. The surface water quality criteria for aquatic life designations must meet the general criteria for pH within the range of 6.50-9.0. For cold water aquatic life, the DO shall exceed 6 mg/L at all times, and the water temperature must be 22°C or less with a maximum daily average of no greater than 19°C. The averages for each site are listed below in Table 5.

Table 5. Summary of multi-parameter measurement averages.

Location	Temperature (°C)	Conductivity (µS/cm)	pH	DO (mg/L)	Turbidity (NTU)
RCK 104 at the Mouth	10.71	496.00	8.29	10.32	14.17
RCK 103 at the Park	11.11	429.46	8.08	9.82	16.94
RCK 101 at the Store	6.10	107.00	7.83	10.87	6.58
RCK 105 at 4th Fork	8.15	68.05	7.77	9.91	4.14

Exceedances

There were four TSS, nine TP, and one *E.coli* exceedances during the FY'20 monitoring. The numbers of departures at each location for each target from the Idaho's water quality criteria are documented below in Table 6. The total numbers of samples collected are included in the table for reference. The average exceedance for TP was 0.105 mg/L, the average exceedance for TSS was 61 mg/L, and the only *E.coli* exceedance occurred on July 21, 2020 was 680 cfu/100 mL. Refer to full data set for exceedance information.

Table 6. Exceedances of the TMDL pollutant targets during the FY'20 monitoring.

Site ID	TSS	TP	E.coli	Temp.	pH	DO	Total No. of Samples
RCK 104	**2**	**4**	0	0	0	0	11
RCK 103	**2**	**5**	**1**	0	0	0	12
RCK 101	0	0	0	0	0	0	8
RCK 105	0	0	0	0	0	0	11

Discharge

Flow data is displayed in the following graph, Figure 3. DEQ collected flow at RCK 103, RCK 101, and RCK 105. Flow data at the Rock Creek Park (RCK 103) is a combination of flow measurements taken at Deadman Gulch and the reported USGS flow measurements of 13092747 Rock Creek AB HWY 30/93 XING at Twin Falls. Rock Creek flow at the mouth (RCK 104) is estimated and therefore is not included in this review. During certain times of the year, usually July-September, the water in Rock Creek at the Rock Creek General Store is completely diverted by irrigation water users. During the FY'20 the monitoring location RCK 101 had no flow or no measurable flow in October, January, July, August, and September.

The calculated discharge follows the irrigation "pattern", with peak flows in the spring and fall, and a decline in flow after October to March during the "winter flow".

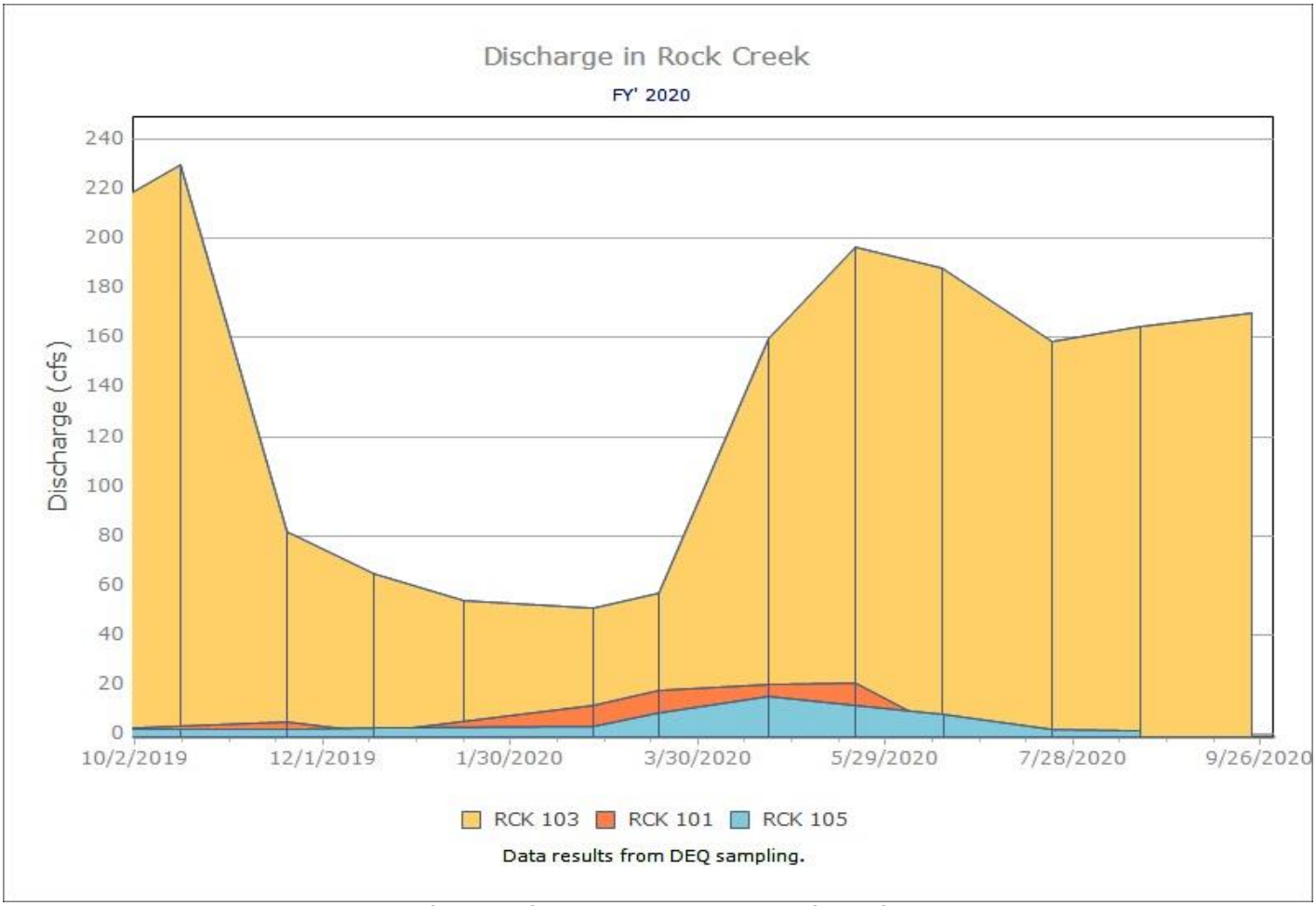
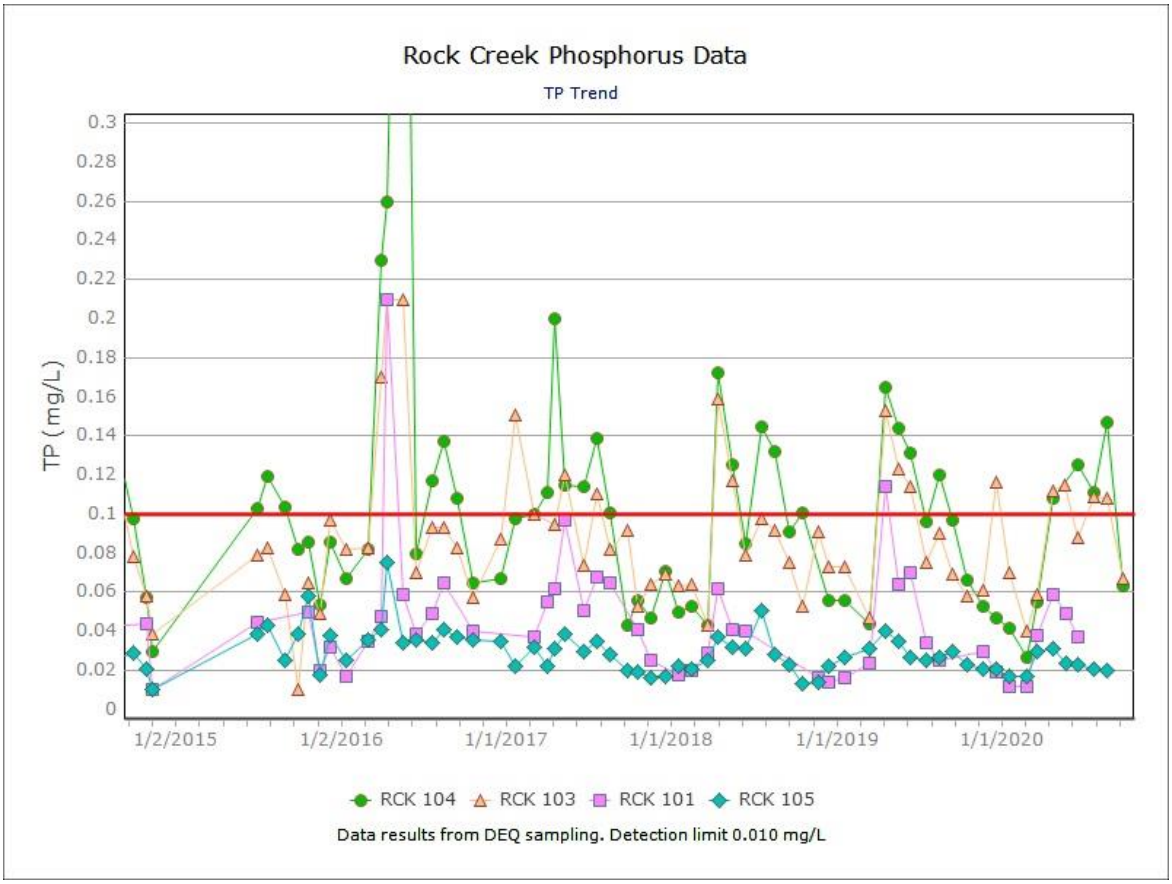


Figure 4. Flow measurements on Rock Creek

Historical

The following graph, Figure 4, shows the trend within the sampling period from 2014-2020. The red line refers to the target of 0.10 mg/L of TP.



The historical water quality data in Rock Creek show trends of TP spikes around April and around late July to mid-August. The year 2016 was a high precipitation year and the data reflects higher TP concentrations throughout that year, especially in the Spring. Consistently, RCK 104, near the mouth, has the highest TP concentrations, whereas, RCK 105 at Fourth Fork, towards the head waters, has the lowest TP concentrations.

Summary

The following data is a summary from the DEQ's data set on Rock Creek from October 2019 to September 2020, refer to Table 7. The water quality parameters summarized below include the pollutants of concern in the Upper Snake Rock TMDL (TP, TSS, and *E. coli*).

Table 7. Summary of data from fiscal year 2020.

Pollutant	TMDL Targets	Number of samples	Average of data set	Number of Exceedances	% Exceedances
TP	0.10 mg/L	42	0.053 mg/L	9	9.52 %
TSS	52 mg/L	42	18.60 mg/L	4	21.43 %
E. coli	576 cfu/100mL – SCR	42	129.21 MPN/100mL	1	2.38 %

Accomplishments

DEQ and BOR continue to have a partnership to further the monitoring efforts in the Rock Creek watershed. This data will be beneficial to support the TMDL efforts in this subbasin.

Projects continue to be implemented throughout the Rock Creek drainage and will contribute to further improvements in water quality.